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Drug Abuse Warning Network

The CBHSQ Report

Short Report

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TEMPORAL PATTERNS OF EMERGENCY DEPARTMENT VISITS RELATED TO UNDERAGE DRINKING

AUTHORS

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INTRODUCTION

Underage drinking continues to be a serious public health issue in the United States. In 2013, nearly 1 in 4 (8.7 million) adolescents and young adults under the legal drinking age of 21 drank alcohol in the past month.[1] Of all adolescents and young adults aged 12 to 20, about 14 percent (5.4 million) were binge drinkers, and 4 percent (1.4 million) were heavy drinkers.[1,2] According to the National Survey on Drug Use and Health, most underage drinkers aged 12 to 20 reported that the last time they consumed alcohol was at someone else's home (56 percent) or at their own home (30 percent).[3] The location of drinking varied by age, with drinkers aged 12 to 14 more likely than those aged 15 to 17 and those aged 18 to 20 to have been drinking in their own home (37 vs. 25 and 31 percent, respectively). However, those aged 12 to 14 were less likely than adolescents aged 15 to 17 to report drinking at someone else's home (49 vs. 61 percent). Young adults aged 18 to 20 were more likely than adolescents aged 12 to 14 and adolescents aged 15 to 17 to consume alcohol in venues such as restaurants, bars, and clubs (10 vs. 2 and 3 percent, respectively).[3] Underage drinkers are at risk of injury from events such as car crashes, burns, falls, drowning, and alcohol and drug poisoning, which could require hospitalization or result in death.[3]

According to the Drug Abuse Warning Network (DAWN), between 158,000 and 205,000 emergency department (ED) visits involved underage drinking per year from 2004 to 2011. DAWN was a public health surveillance system that monitored drug- and underage drinking–related ED visits in the United States. To have been a DAWN case, an ED visit must have involved a drug, either as the direct cause of the visit or as a contributing factor. For individuals younger than age 21, DAWN tracked ED visits involving alcohol only and alcohol combined with illicit drugs and/or pharmaceuticals. This issue of *The CBHSQ Report* examines temporal patterns of underage drinking—specifically, time of day and day of the week—from 2004 to 2011. This report examines alcohol-related ED visits among patients aged 12 to 20 and for the subgroups of patients aged 12 to 17 and 18 to 20. Patients aged 12 to 17 are subsequently referred to as "adolescents," and those aged 18 to 20 are referred to as "young adults."

In Brief

- From 2004 to 2011, alcohol-related emergency department (ED) visits by patients aged 12 to 20 peaked on Friday and Saturday nights between 12:00 a.m. (midnight) and 2:59 a.m. the following morning.
- Friday and Saturday nights (from 9:00 p.m. to 5:59 a.m. the following morning) had more underage drinking–related ED visits per hour than other nights.
- Underage drinking–related ED visits per hour also were higher on weeknights compared with weekdays.
- For patients aged 18 to 20, the peak period for alcohol-related ED visits was Friday and Saturday nights from midnight (12:00 a.m.) until 5:59 a.m. the following morning. In comparison, the peak in alcohol-related ED visits for patients aged 12 to 17 was Friday and Saturday nights from 9:00 p.m. until 2:59 a.m. the following morning.

Although many surveys collect information about underage drinking, including data on frequency, quantities consumed, and incidence of underage drinking–related ED visits, much less information is available about patterns of risky behavior on a daily or weekly basis.[4] Knowledge of the temporal aspects of a severe outcome of underage drinking through examining ED visits may provide important information about developing age-appropriate prevention messages that target the time periods that have the highest risk of underage drinking.

To find out the days and times when underage drinking–related ED visits were most likely to occur, DAWN data on ED visits from 2004 to 2011 were combined. The total number of visits involving underage drinking by patients aged 12 to 20 was estimated to be nearly 1.5 million.[5] Suicide attempts involving alcohol were excluded because they involve the deliberate use of alcohol for self-harm and may reflect a different pattern than recreational drinking.

The multiyear data were divided into eight 3-hour periods per day for each day of the week. The first time period started on Sunday at 9:00 p.m. These time periods were the minimum needed to ensure enough visits for analysis in any given time period (Figure 1).[6] Each 3-hour period was compared with every other period in the week to identify the peak periods for underage drinking–related ED visits during the week.[7] These steps were then repeated for the 12 to 17 and 18 to 20 age groups.

Next, to assess whether any nights had elevated numbers of ED visits, the week was divided into nighttime periods, defined as 9:00 p.m. to 5:59 a.m., and daytime periods, defined as 6:00 a.m. to 8:59 p.m. The visits per hour for Friday and Saturday nights were compared with the visits per hour for weekday nights (Sunday through Thursday). The weeknights were then compared with weekdays. Because Friday and Saturday nights were treated as the weekend, Sunday night at 9:00 p.m. was treated as the first night of the week. Starting with Sunday night, the visits per hour for each weeknight were compared with the visits per hour for the following day to assess whether visits on weeknights were higher than daytime visits. These steps were then repeated for the 12 to 17 and 18 to 20 age groups.

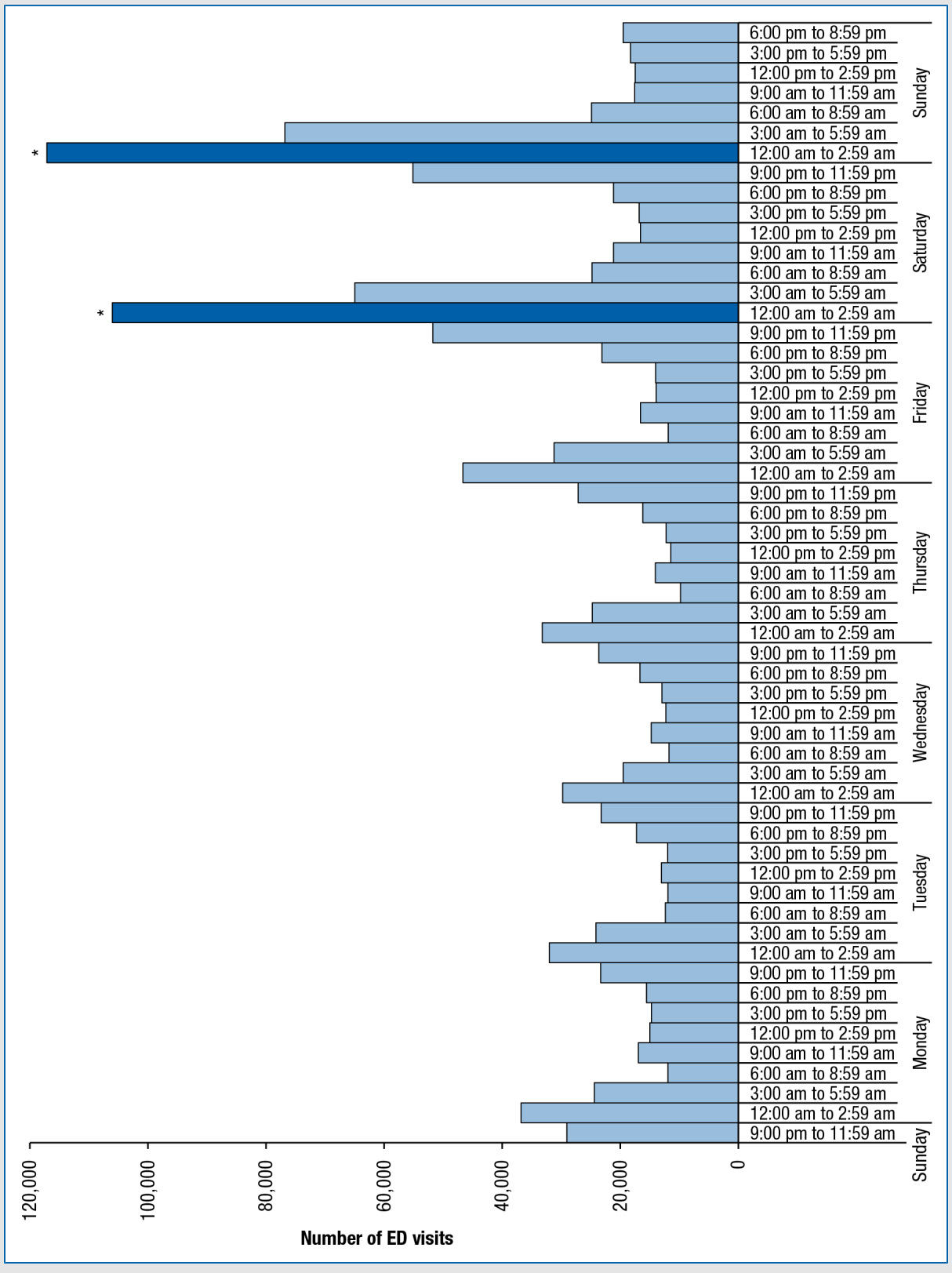
RESULTS

Alcohol-related ED visits involving patients aged 12 to 20 peaked on Friday and Saturday nights between 12:00 a.m. (midnight) and 2:59 a.m. (Figure 1). Visits per hour were also higher during weekend nighttime periods (9:00 p.m. to 5:59 a.m.) than weeknight periods (Figure 2). Because much underage drinking occurs in a social context, and socializing among adolescents and young adults tends to occur on Friday and Saturday nights, this temporal pattern is not surprising.[3,7] However, when each weeknight (Sunday night through Thursday night) was compared with the following weekday, nighttime visits were consistently higher than daytime visits (Figure 2).

When the data for the age subgroups (12 to 17 and 18 to 20) were analyzed, different patterns emerged. For young adults, the peak periods for alcohol-related ED visits started on Friday and Saturday nights between 12:00 a.m. and 2:59 a.m. and continued until 5:59 a.m. the following morning (Figure 3). In contrast, the peak period for alcohol-related ED visits for adolescents began at 9:00 p.m. on Friday and Saturday nights and continued until 2:59 a.m. the following morning (Figure 4).

For both the young adults and adolescents, visits per hour were higher during weekend nighttime periods (9:00 p.m. to 5:59 a.m.) than during weeknights (Figures 5 and 6). Throughout the week, nighttime visits per hour were higher than daytime visits per hour.

Figure 1. Emergency department (ED) visits involving underage drinking[1] among patients aged 12 to 20, by time of day and day of the week: 2004 to 2011



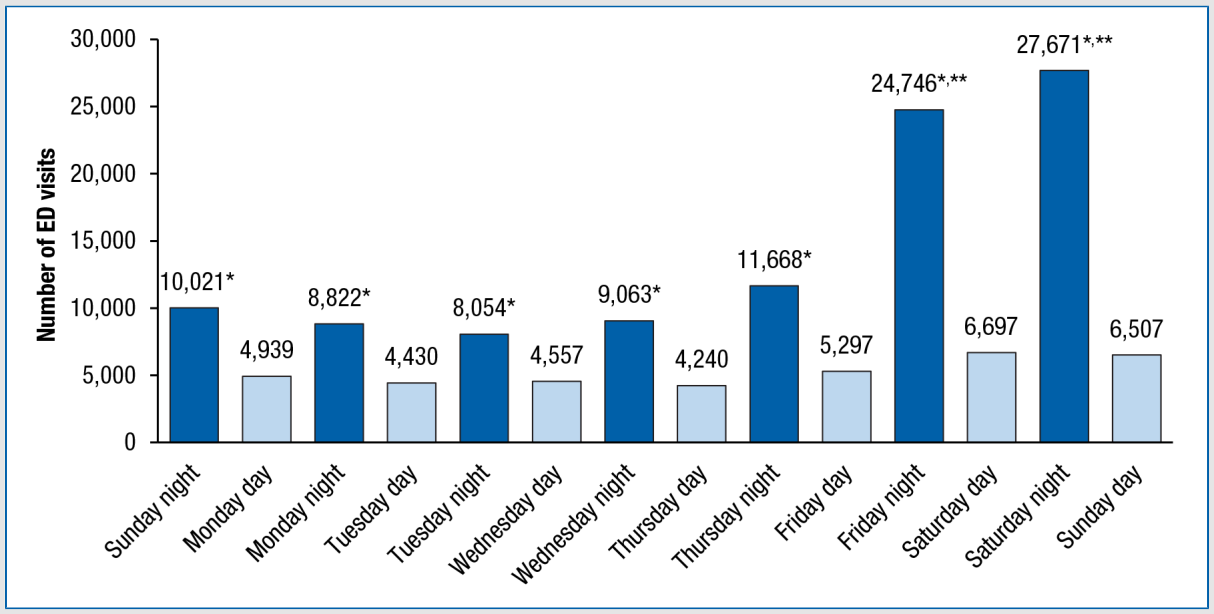
[1] Suicide attempts were excluded.

* Difference between the 12:00 a.m. to 2:59 a.m. periods on Saturday and Sunday is not statistically significant. The 12:00 a.m. to 2:59 a.m. periods on Saturday and Sunday are statistically different from all other time periods in the week.

Note: The adjusted alpha level is based on .05 with the Bonferroni correction.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, Drug Abuse Warning Network (DAWN), 2004 to 2011.

Figure 2. Average emergency department (ED) visits[1] involving underage drinking per hour by day/night[2] for patients aged 12 to 20: 2004 to 2011



[1] Suicide attempts were excluded.

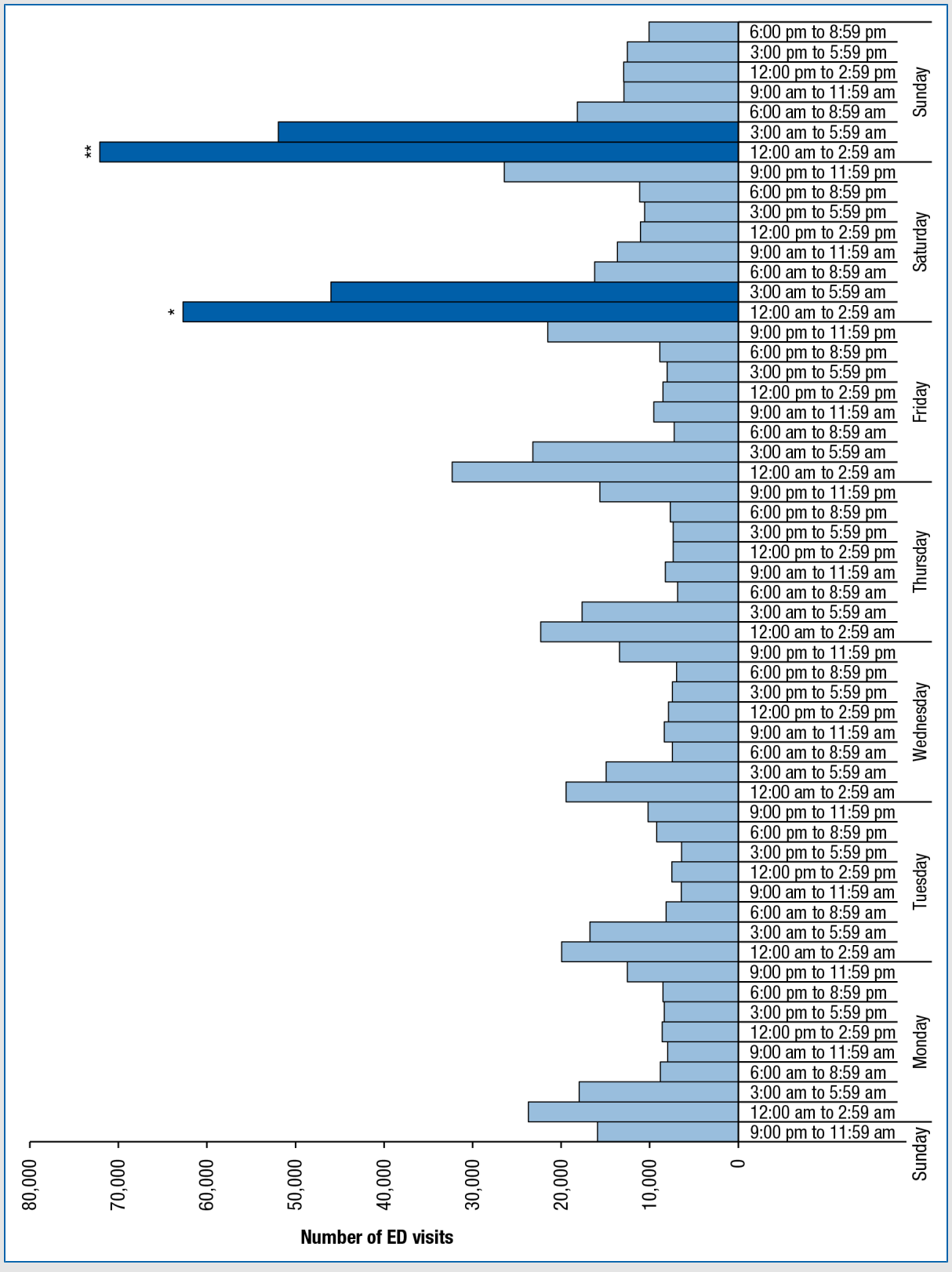
[2] The "day" period is defined as 6:00 a.m. to 8:59 p.m., and the "night" period is defined as 9:00 p.m. to 5:59 a.m.

* Difference between day and night is statistically significant at the .05 level.

** Friday and Saturday nights were statistically different from other nights of the week.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, Drug Abuse Warning Network (DAWN), 2004 to 2011.

Figure 3. Emergency department (ED) visits involving underage drinking[1] among patients aged 18 to 20, by time of day and day of the week: 2004 to 2011



[1] Suicide attempts were excluded.

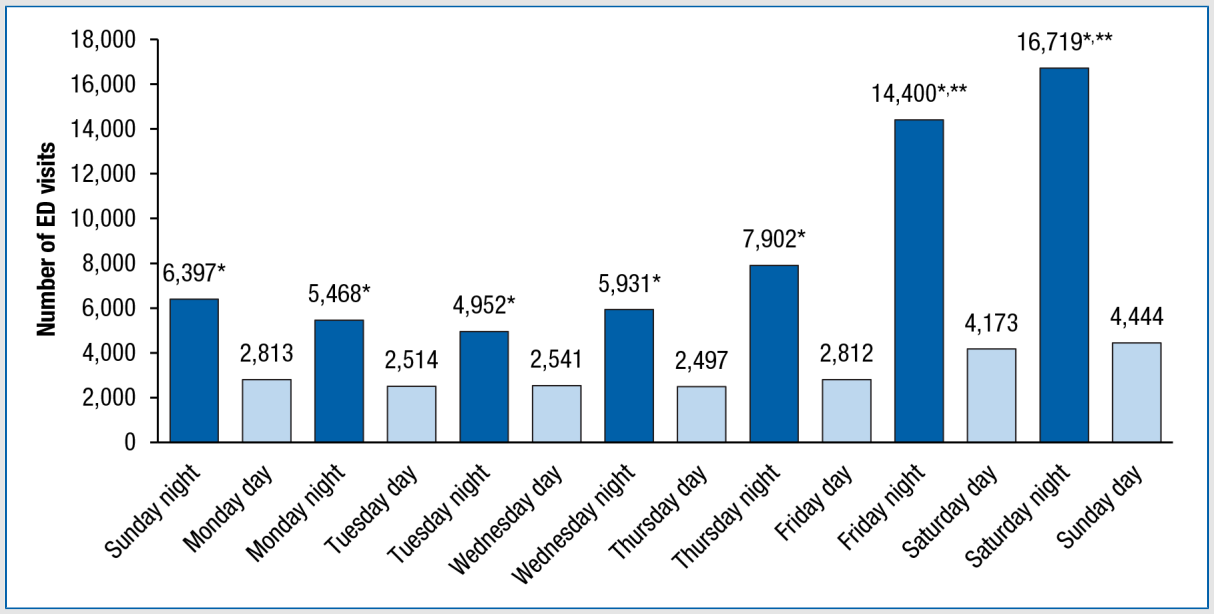
* The 12:00 a.m. to 2:59 a.m. period on Saturday is statistically different from all other periods in the week except the 3:00 a.m. to 5:59 a.m. period on Saturday, the 12:00 a.m. to 2:59 a.m. period on Sunday, and the 3:00 a.m. to 5:59 a.m. period on Sunday.

** The 12:00 a.m. to 2:59 a.m. period on Sunday is statistically different from all other time periods in the week except the 12:00 a.m. to 2:59 a.m. period on Saturday, the 3:00 a.m. to 5:59 a.m. period on Saturday, and the 3:00 a.m. to 5:59 a.m. period on Sunday.

Note: Adjusted alpha level is based on .05 with the Bonferroni correction.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, Drug Abuse Warning Network (DAWN), 2004 to 2011.

Figure 4. Average emergency department (ED) visits[1] involving underage drinking per hour by day/night[2] for patients aged 18 to 20: 2004 to 2011



[1] Suicide attempts were excluded.

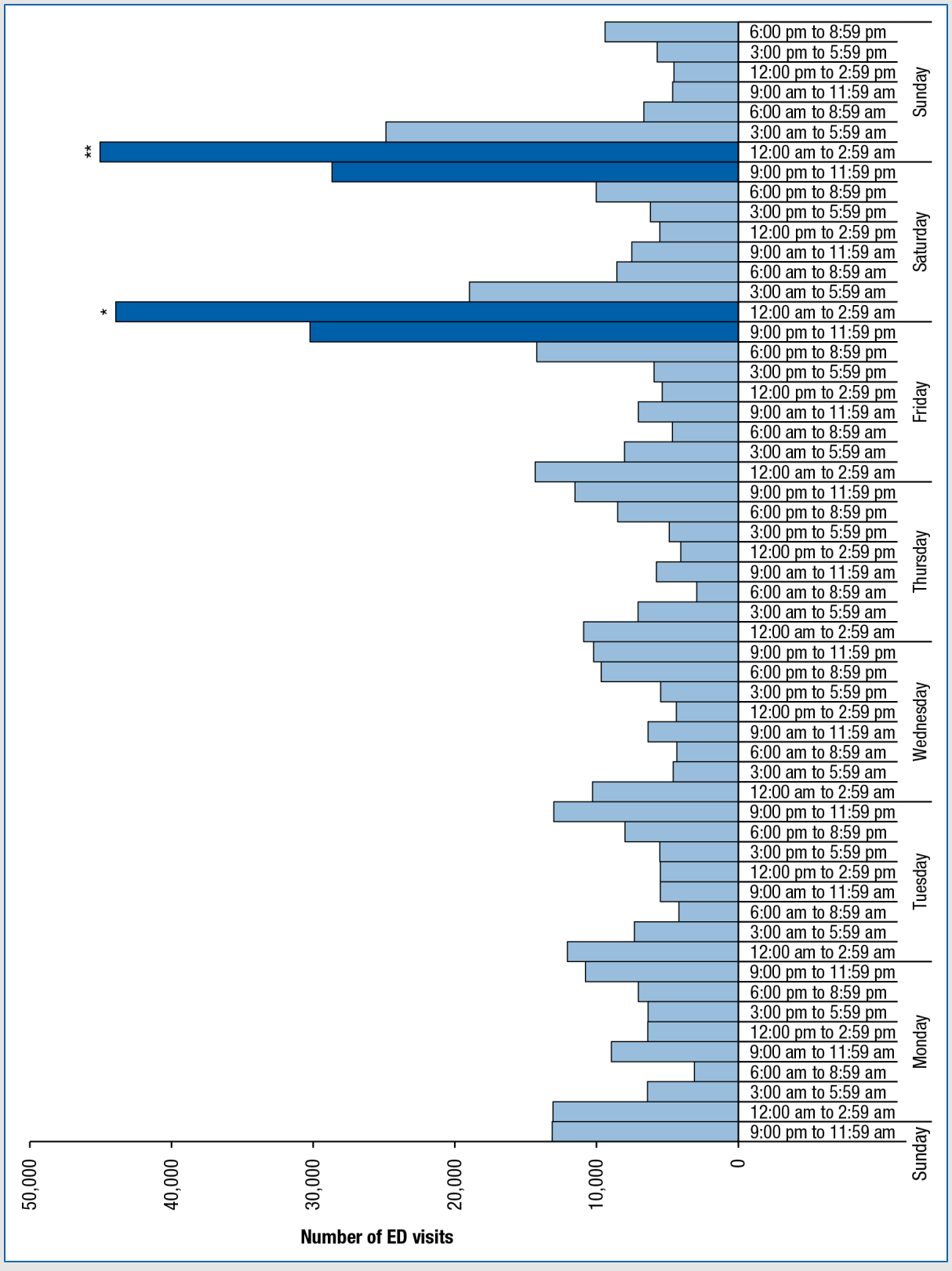
[2] The "day" period is defined as 6:00 a.m. to 8:59 p.m., and the "night" period is defined as 9:00 p.m. to 5:59 a.m.

* Difference between day and night is statistically significant at the .05 level.

** Friday and Saturday nights are statistically different from other nights of the week at the .05 level.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, Drug Abuse Warning Network (DAWN), 2004 to 2011.

Figure 5. Emergency department (ED) visits involving underage drinking[1] among patients aged 12 to 17, by time of day and day of the week: 2004 to 2011



[1] Suicide attempts were excluded.

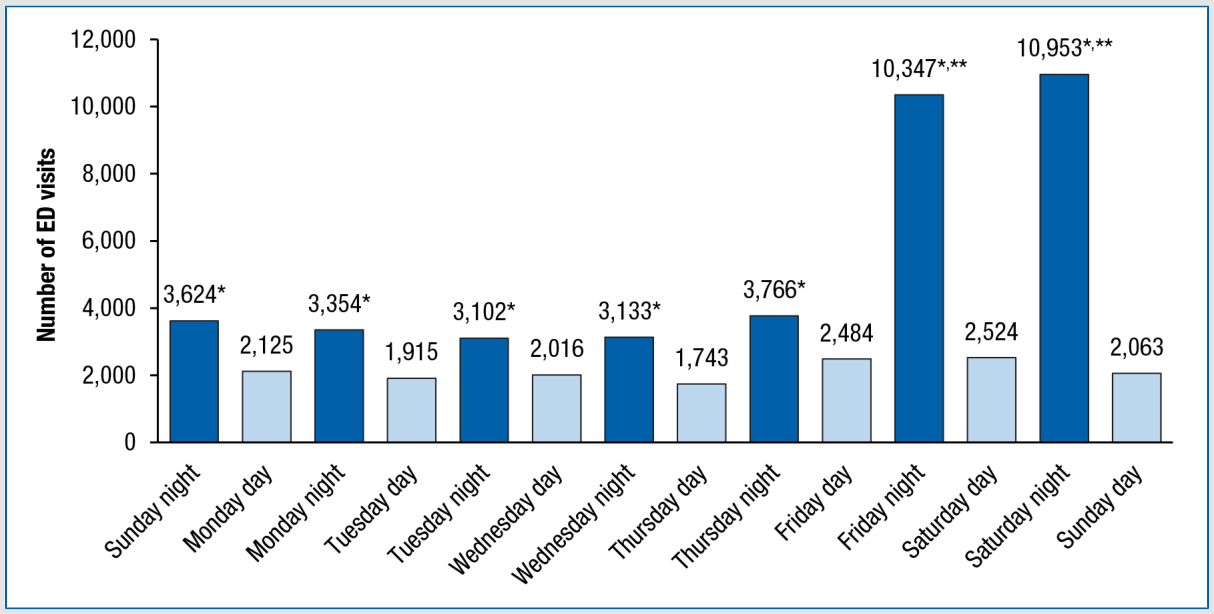
* The 12:00 a.m. to 2:59 a.m. period on Saturday is statistically different from all other periods in the week except 9:00 p.m. to 11:59 p.m. Friday, 9:00 p.m. to 11:59 p.m. Saturday, and 12:00 a.m. to 2:59 a.m. Sunday.

** The 12:00 a.m. to 2:59 a.m. period on Sunday is statistically different from all other periods in the week except the 12:00 a.m. to 2:59 a.m. period on Saturday, the 9:00 p.m. to 11:59 p.m. period on Friday, and the 9:00 p.m. to 11:59 p.m. period on Saturday.

Note: Adjusted alpha level is based on .05 with the Bonferroni correction.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, Drug Abuse Warning Network (DAWN), 2004 to 2011.

Figure 6. Average emergency department (ED) visits[1] involving underage drinking per hour by day/night[2] for patients aged 12 to 17: 2004 to 2011



[1] Suicide attempts were excluded.

[2] The "day" period is defined as 6:00 a.m. to 8:59 p.m., and the "night" period is defined as 9:00 p.m. to 5:59 a.m.

* Difference between day and night is statistically significant at the .05 level.

** Friday and Saturday nights are statistically different from other nights of the week at the .05 level.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, Drug Abuse Warning Network (DAWN), 2004 to 2011.

DISCUSSION

Alcohol-related injuries and other health consequences can occur at any time of the day or week when underage adolescents and young adults consume alcohol. These consequences can range from relatively minor injuries, which result in being treated and released from the ED, to serious and even deadly consequences, such as alcohol poisoning and motor vehicle crashes.

The DAWN data show that ED visits involving underage drinking are highest on weekend evenings and early mornings, times when adolescents and young adults are likely to engage in social activities and possibly drive while under the influence of alcohol. Friday and Saturday nights had more ED visits per hour than Sunday through Thursday nights for adolescents and young adults. The increase in ED visits by young adults started in the 12:00 a.m. to 2:59 p.m. period and continued until 5:59 a.m. on Friday and Saturday nights. In comparison, ED visits by adolescents started earlier in the evening on Friday and Saturday nights (9:00 p.m.) (Figure 5). This may indicate that underage drinking starts earlier in the evening for adolescents than it does for young adults. Furthermore, although the findings were less dramatic, Sunday through Thursday nighttime visits per hour were higher than the following daytime visits per hour for adolescents and young adults (Figure 4).

ED visits are teachable moments when hospital staff can intervene with underage adolescents and young adults and their parents or guardians and discuss the dangers of underage drinking. ED visits also provide insight into when high-risk drinking is occurring. Understanding what times of day and days of the week underage drinkers are visiting the ED and how this is influenced by age can be combined with other information, such as where drinking is taking place and with whom, to develop targeted prevention strategies. For example, parents and other responsible adults will want to be especially vigilant about supervising social activities, monitoring for alcohol use, and permitting access to motor vehicles on Friday and Saturday nights. College administrators could also provide alternative alcohol-free venues and activities to promote safe weekend activities. However, DAWN data reveal that risky drinking behavior takes place throughout the week, even on nights not associated with partying.

ENDNOTES

1. Center for Behavioral Health Statistics and Quality. (2014). *Results from the 2013 National Survey on Drug Use and Health: Summary of national findings* (HHS Publication No. SMA 14-4863, NSDUH Series H-48). Rockville, MD: Substance Abuse and Mental Health Services Administration.
2. Binge drinking is defined as drinking five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days. Heavy alcohol use is defined as drinking five or more drinks on the same occasion on 5 or more days in the past 30 days.
3. Substance Abuse and Mental Health Services Administration. (2015, June). *Report to Congress on the prevention and reduction of underage drinking*. Washington, DC: U.S. Department of Health and Human Services. Retrieved from https://www.stopalcoholabuse.gov/resources/reporttocongress/RTC2014.aspx
4. Maggs, J. L., Williams, L. R., & Lee, C. M. (2011). Ups and downs of alcohol use among first-year college students: Number of drinks, heavy drinking, and stumble and pass out drinking days. *Addictive Behaviors, 36*(3) 197–202.
5. As a sensitivity check, the analysis was repeated in each individual year of data to determine whether any differences occurred in weekly temporal trends over time. The results for each year of observation were consistent with the results from the combined sample.
6. DAWN estimates with relative standard error values greater than 50 percent or estimates based on fewer than 30 ED visits (weighted or unweighted) are considered too imprecise for publication and are not shown.
7. Del Boca, F. K., Darkes, J., Greenbaum, P. E., & Goldman, M. S. (2004). Up close and personal: Temporal variability in the drinking of individual college students during their first year. *Journal of Consulting and Clinical Psychology, 72*(2), 155–164.

SUGGESTED CITATION

Crane, E. H., & Cai, R. (2016). *Temporal patterns of emergency department visits related to underage drinking*. The CBHSQ Report: January 20, 2017. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Rockville, MD.

SUMMARY

Background: Underage drinking is a serious public health issue in the United States. This report analyzes temporal patterns of underage drinking–related emergency department (ED) visits to assess whether the number of these visits is elevated during certain times of the day or days of the week. **Method:** DAWN data on ED visits involving underage drinking by patients aged 12 to 20 that occurred from 2004 to 2011 were combined. The multiyear data were divided into eight 3-hour periods per day for each day of the week and then compared. Average hourly ED visits for weekend nights and weeknights were also compared, and weekdays were compared with weeknights. Calculations were made for patients aged 12 to 20, 12 to 17, and 18 to 20. **Results:** For patients aged 12 to 20, underage drinking–related ED visits peaked between 12:00 a.m. and 2:59 a.m. early on Saturday and Sunday mornings. For patients aged 12 to 17, alcohol-related ED visits peaked between 9:00 p.m. and 2:59 a.m. on Friday night/Saturday morning and Saturday night/Sunday morning. For patients aged 18 to 20, alcohol-related ED visits peaked between 12:00 a.m. and 5:59 a.m. early on Saturday and Sunday mornings. For all age groups, the weekend nights had higher average hourly ED visits than weeknights, and weeknight ED visits were higher than weekday visits. **Conclusion:** ED visits involving underage drinking are highest on weekend evenings and early mornings, times when adolescents and young adults are likely to be engaging in social activities and possibly driving while under the influence of alcohol. The data also reveal that risky drinking behavior takes place throughout the week, even on nights not associated with partying. This information about the timing of ED visits related to underage drinking and how this is influenced by age can be used to inform targeted prevention strategies.

Keywords: alcohol, DAWN, Drug Abuse Warning Network, emergency department, underage drinking

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KEYWORDS

Age Group, Short Report, Emergency Department Data, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, College Students as Audience, Educators, Parents and Caregivers, Prevention Professionals, Public Health Professionals, Reader, Young Adults as Audience, Underage Drinking, Adolescents as Population Group, Young Adults as Population Group, Alcohol, Awareness, Emergency Department Treatment, All US States Only

The Substance Abuse and Mental Health Services Administration (SAMHSA) is the agency within the U.S. Department of Health and Human Services that leads public health efforts to advance the behavioral health of the nation. SAMHSA's mission is to reduce the impact of substance abuse and mental illness on America's communities.

The Drug Abuse Warning Network (DAWN) was a public health surveillance system that monitored drug-related morbidity and mortality. DAWN used a probability sample of hospitals to produce estimates of drug-related emergency department (ED) visits for the United States and selected metropolitan areas annually. DAWN also produced annual profiles of drug-related deaths reviewed by medical examiners or coroners in selected metropolitan areas and states.

Any ED visit related to recent drug use was included in DAWN. All types of drugs—licit and illicit—were covered. Alcohol involvement was documented for patients of all ages if it occurred with another drug. Alcohol was considered an illicit drug for minors and was documented even if no other drug was involved. The classification of drugs used in DAWN was derived from the Multum Lexicon, copyright 2012 Lexi-Comp, Inc., and/or Cerner Multum, Inc. The Multum Licensing Agreement governing use of the Lexicon can be found at http://www.samhsa.gov/data/emergency-department-data-dawn.

DAWN was one of three major surveys conducted by SAMHSA's Center for Behavioral Health Statistics and Quality (CBHSQ). For more information on other CBHSQ surveys, go to http://www.samhsa.gov/data/. SAMHSA contracted with Westat (Rockville, MD) and RTI International (Research Triangle Park, NC) to operate the DAWN system and produce publications. RTI International is a registered trademark and a trade name of Research Triangle Institute.

For publications and additional information about DAWN, go to http://www.samhsa.gov/data/emergency-department-data-dawn.

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